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(54) IMPROVEMENTS IN OR RELATING TO SLIDING CLASP FASTENERS

(71) I, WILHELM UHRIG, a citizen of the Federal Republic of Germany, of 56 Wuppertal-Elberfeld, Mannesmannstrasse 11, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to sliding clasp fasteners and to a method of making stops for limiting the travel of sliding clasps in sliding clasp fasteners having woven support tapes and having rows of teeth consisting of synthetic thermoplastic material.

In a known method of making individual sliding clasp fasteners from an unbroken, continuous, engaged sliding clasp fastener tape, described in German Patent Specification No. 1,164,140, gaps at least as long as a sliding clasp are cut in the rows of teeth on the continuous tape at intervals equal to the length of a fastener, and a clasp is then inserted in each gap and pushed on to the end of the row of teeth. A similar method of fitting sliding clasps is revealed in German Patent Specification No. 1,283,586. In the known method stops for limiting the travel of the clasp are attached to the fastener tape before the cutting of the gaps and the insertion of the clasps. To this end, in the known method, plastics material, for example synethetic plastics film, is melted on to the tapes where the gap is to be formed in the rows of teeth, and is formed into the stops for limiting the clasp travel.

This method of forming the stops, however, is expensive due to the considerable quantity of synthetic plastics used and the relatively long cooling and setting line required. Also, this method produces relatively extensive, thick and stiff rolls of synthetic plastics on the ends of the finished fasteners, and these rolls may form obstructions while the fasteners are being sewn on or used.

An object of the invention is to provide [P

a method of making the clasp travel stops which is very economical as regards both material and plant and which does not make the fastener ends stiff. A further requirement of the method in accordance with the invention is that it should be applicable to the automatic fitting of clasps to continuously advancing, engaged sliding clasp fastener tapes.

According to one aspect of the invention there is provided a method of making end stops for limiting the travel of a sliding clasp in a sliding clasp fastener having two woven support tapes and having rows of teeth consisting of synthetic thermoplastic material, comprising heating the teeth in the regions where the end stops are to be formed, and deforming under pressure localised areas of the heated thermoplastic material, together with adjoining areas of the tapes, so as to form localised recessed depressions of said material which form the end stops.

In the method in accordance with the invention, therefore, the stops are made from synthetic thermoplastic material which is already present in the fastener tapes, and the size and shape of the stops are restricted to what their function as stops demands. There are therefore no thick synthetic plastics rolls on the ends of the fastener. Another advantage is that the ends of the finished fastener remain free of sharp-edged plastics. A fastener with the stops formed by the depressions as described is uniformly flexible. Practical tests have shown that the depressions formed by the method in accordance with the invention have adequate strength and dimensional stability in spite of their relatively thin walls, particularly since, for example if cotton threads are used for the support tapes, they consist primarily of plastics reinforced, as it were, with textile fibres.

According to a preferred feature of the

invention, the quantity of synthetic plastics material available for forming the depressions is increased by using thermoplastic filaments in the weave of the support tapes.

Particularly stable stops can be obtained, in accordance with a further preferred feature of the invention, if during the deformation additional thermoplastic material is supplied to said regions in the form of films drawn over punches which effect the deformation and/or over the dies with which the punches cooperate. This method of applying additional synthetic plastics material differs fundamentally from the known method described, however, in that the material is applied, and formed into the stops only at the regions intended for the stops, that is to say, there is no excess to form rolls which make the ends of the fastener thick and hard.

The method in accordance with the invention may be carried out in connection with the automatic fitting of clasps to continuously advancing fastener strips, in which case, according to another preferred feature of the invention, the deformation of the clasp travel stops may take place at the same time as punching of the gaps provided in the rows of teeth for insertion of the clasp.

According to another aspect of the invention there is provided a sliding clasp fastener made according to the method of said one aspect and comprising two woven support tapes supporting rows of teeth consisting of synthetic thermoplastic material, the thermoplastic material and adjoining area of the tapes being locally deformed under pressure to provide recessed depressions forming the end stops which limit the travel of the sliding clasp along the fastener.

The invention will be further described, by way of example, with reference to the drawings, in which:—

Figure 1 represents a diagrammatic longitudinal section through a sliding clasp fastener in accordance with the invention, the section being taken on the line I—I in Figure 2,

Figure 2 is a plan view of the fastener,

Figure 3 shows a section through a stop with a symmetrical cross-section, and

Figure 4 shows a section through a stop with an asymmetrical cross-section.

Figures 1 and 2 show an engaged sliding clasp fastener 1 with two woven support tapes 2 and 3 and interengaged rows of teeth 4. The engaged fastener is moving in the direction indicated by an arrow 5 in Figure 1. In the embodiment illustrated, three elongated limit stops are formed in the fastener 1 for every individual fastener length. Each stop is formed by heating and then deforming the thermoplastic material under pressure, this being done by means of a punch and a cooperating die. One of these stops forms the limit stop at one end of the fastener (hereinafter referred to as the lower end), this lower stop being in the form of a recessed depression 6 extending over the two engaged rows of teeth 4 at right-angles to these rows, connecting the two supporting tapes 2 and 3 firmly together.

The two remaining stops, which are upper limit stops, are also in the form of recessed depressions 7, but they are disposed on respective sides of the centre line of the fastener, being arranged at an angle to the centre line so that the two stops 7 diverge in the direction of the arrow 5, i.e. in a direction away from the stop 6. Filaments 8 of synthetic thermoplastic material are provided at the regions intended for the stops 6 and 7 in the weave of the support tapes in order to reinforce the depressions.

Between each stop 6 and the two stops 7 immediately following it, enough space is left for a gap 9 approximately the same size as the sliding clasp 10 to be punched out of the teeth. The punching of the gap 9 and the deformation of the depressions forming the stops 6, 7 may be carried out on the continuously advancing fastener 1 simultaneously. The fastener will then pass to a clasp fitting station in which a suitable inserting device inserts the clasp 10 in the gap 9 so that the clasp is lying in the same plane as the fastener tape, with its open end facing the upper stops 7. As the tape continues to advance, the rows of teeth 4 in the fastener halves are introduced into the lateral channels provided for them in the clasp 10, and the front ends disengage and splay apart far enough for the clasp 10 to run over the upper stops 7. The inserting device then releases the clasp 10, which has now been fitted to the fastener tape and is entrained by the tape. In the same way each of the fastener lengths in the fastener tape receives its clasp. The fastener tape is then simply cut at the gaps 9 to make the individual fasteners. Because the depressions forming the upper stops 7 are splayed apart, the clasp can only run over them in one direction (towards the left in Figure 2). If the clasp moves in the opposite direction, its front face hits the inner corners of the stops 7. The clasp 10 is thus held captive on the fastener by the stops 6 and 7.

Figure 3 illustrates a symmetrical transverse cross-section for the upper stops 7 and for the lower stops 6.

Figure 4 illustrates an asymmetrical cross-section which may be provided for the two upper stops 7. In this case the lower flank 11 of each depression is steep and forms an abrupt step and the upper flank 12, which faces the gap 9 in the teeth, slopes gently. When a downward pressure is applied, the sliding clasp can run over the depressions

when approaching them from the gently sloping flank, whereas the steep flank stops the clasp. If the cross-section shown in Figure 4 is used, the stops 7 may be in line with one another instead of being splayed apart. Preferably, however, the asymetrical cross-section shown in Figure 4 is combined with a splayed arrangement of the upper stops 7.

If desired, additional thermoplastic material may be supplied to the regions in which the stops 6 and 7 are to be formed, this additional material being in the form of films drawn over the punch and/or over the die with which the punch cooperates.

WHAT I CLAIM IS:—

1. A method of making end stops for limiting the travel of a sliding clasp in a sliding clasp fastener having two woven support tapes and having rows of teeth consisting of synthetic thermoplastic material, comprising heating the teeth in the regions where the end stops are to be formed, and deforming under pressure localised areas of the heated thermoplastic material, together with adjoining areas of the tapes, so as to form localised recessed depressions of said material which form the end stops.

2. A method according to claim 1, wherein the quantity of synthetic thermoplastic material available for forming the recessed depressions is increased by using thermoplastic filaments in the weave of the support tape.

3. A method according to claim 1 or 2, wherein during the deformation of the thermoplastic material, additional thermoplastic material is supplied to said regions in the form of films drawn over a punch which provides the deformation and/or over a die with which the punch cooperates.

4. A method according to any of the preceding claims, wherein the deformation of the thermoplastic material takes place at the same time as the punching of a gap in the teeth for the insertion of the clasp.

5. A method according to any of the preceding claims, wherein one recessed stop is formed at a location defining a limit stop for one end of the sliding fastener and two further recessed stops are formed at a location defining limit stops for the other end of the fastener.

6. A method according to claim 5, wherein the two further recessed stops are disposed symmetrically on respective sides of the central longitudinal axis of the fastener.

7. A method according to claim 6, wherein the two further recessed stops are elongated, the longitudinal axis of each further stop being disposed at an angle to said central longitudinal axis so that the two further stops diverge in a direction away from said one recessed stop.

8. A sliding clasp fastener made by a method according to any of the preceding claims and comprising two woven support tapes supporting rows of teeth consisting of synthetic thermoplastic material, the thermoplastic material and adjoining area of the tape being locally deformed under pressure to provide recessed depressions forming the end stops which limit the travel of the sliding clasp along the fastener.

9. A fastener according to claim 8, wherein one recessed stop forms a limit stop at one end of the fastener, two further recessed stops together being disposed at the other end of the fastener.

10. A fastener according to claim 9, wherein the two further stops are disposed on respective sides of the central longitudinal axis of the fastener, the two further stops being elongated and disposed at an angle with respect to said central longitudinal axis, whereby the clasp is permitted to travel over the two further stops when the clasp is moved towards said one stop during the manufacture of the fastener but which is thereafter held captive on the teeth by the stops at respective ends of the fastener.

11. A fastener according to any of claims 8 to 10, wherein each of the depressions has a symmetrical cross-section, taken on a plane transverse to its direction of elongation.

12. A fastener according to claim 9 or 10, wherein the two further depressions have an asymmetrical transverse cross-section, each having a gently sloping flank facing generally away from said one end of the fastener and an abrupt flank forming a step facing generally towards said one end of the fastener, the two steps forming end abutments which limit the movement of the clasp.

13. A method of making end stops for limiting travel of a sliding clasp in a sliding clasp fastener, the method being substantially as herein particularly described with reference to Figures 1 to 3, or as modified by Figure 4, of the accompanying drawings.

14. A sliding clasp fastener constructed and arranged substantially as herein particularly described with reference to Figures 1 to 3, or as modified by Figure 4, of the accompanying drawings.

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FIG. 1

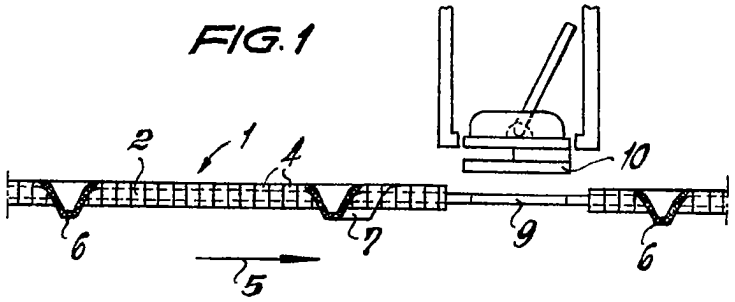

FIG. 2

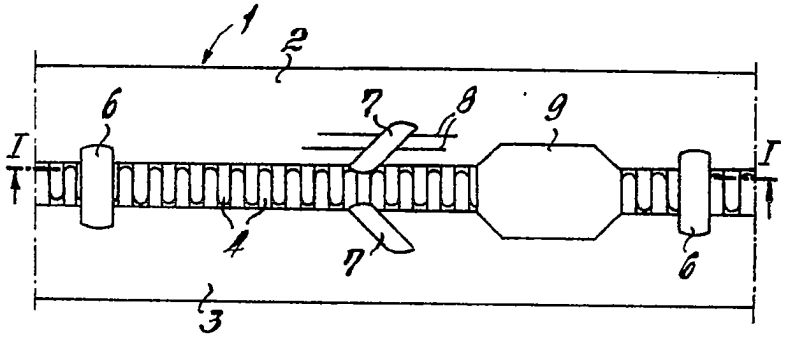

FIG. 3

FIG. 4